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(54) **PORTABLE MANWAY SECURING APPARATUS**

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B65D 90/10 (2006.01)
E02D 29/14 (2006.01)

(52) **U.S. Cl.**
CPC ***B65D 90/10*** (2013.01); ***E02D 29/1427*** (2013.01)

(58) **Field of Classification Search**
CPC B65D 90/00; B65D 90/10; B65D 90/105; B65D 88/76; B65D 90/22; B61D 5/08; B61D 17/16; E02D 29/1427; E02D 29/14
See application file for complete search history.

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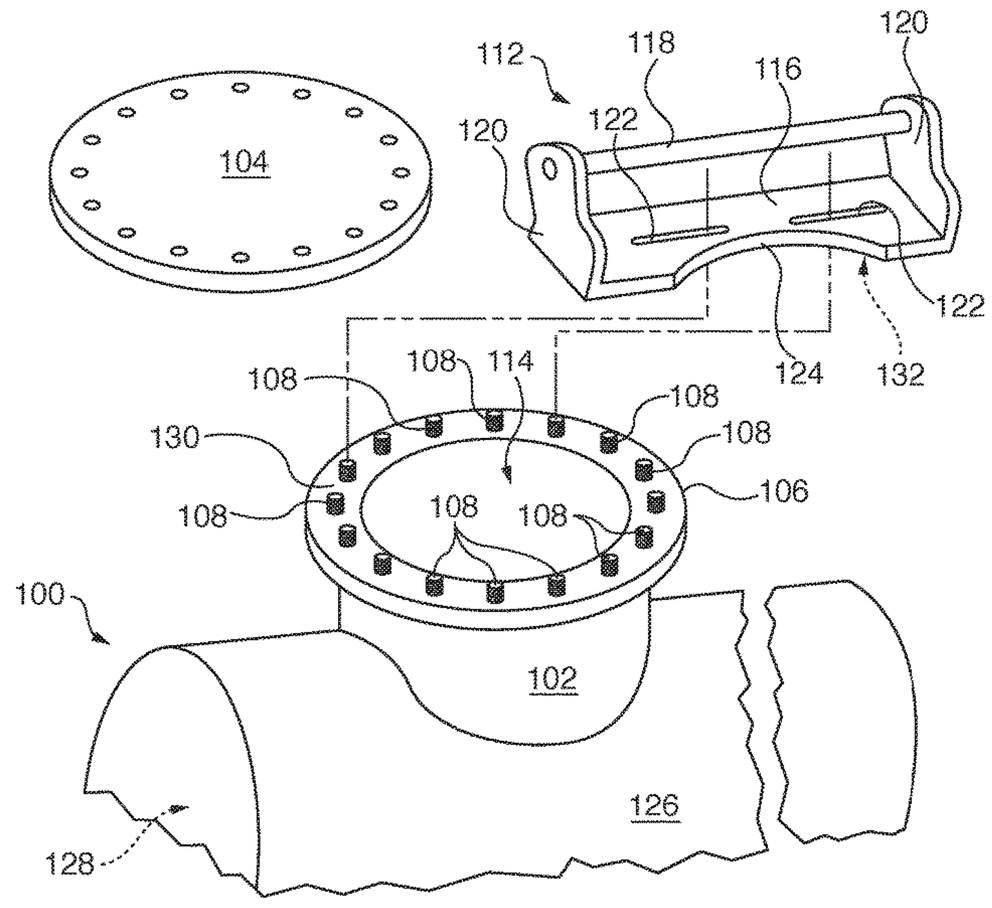
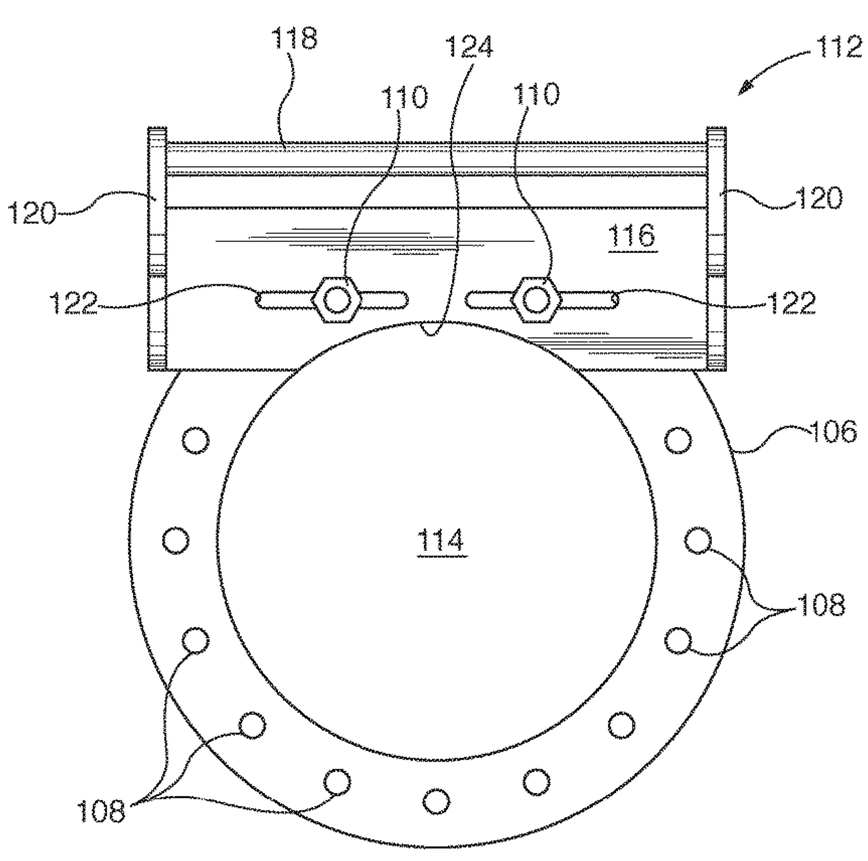
(57) **ABSTRACT**

A portable securing apparatus which is readily secured to a manway of a vessel having a portal intended to enable entry of service personnel into the vessel is described. The securing apparatus affords an improved grip to assist service personnel to enter the vessel. The securing apparatus is for temporary mounting to the manway. The securing apparatus includes a mounting plate mountable to a flange conventionally provided as part of the manway, and a handle for accommodating manual grasp of the securing apparatus.

16 Claims, 2 Drawing Sheets





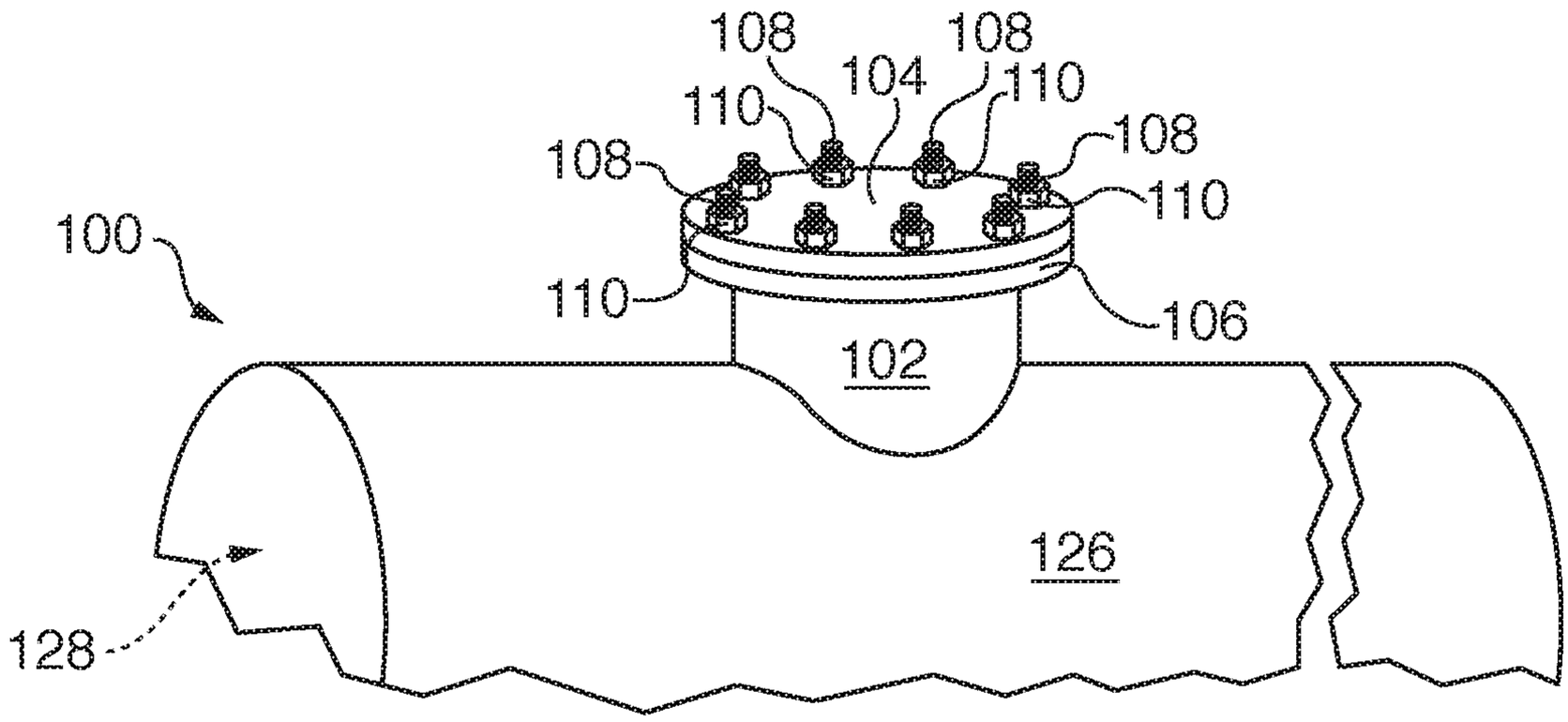

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FIG. 1

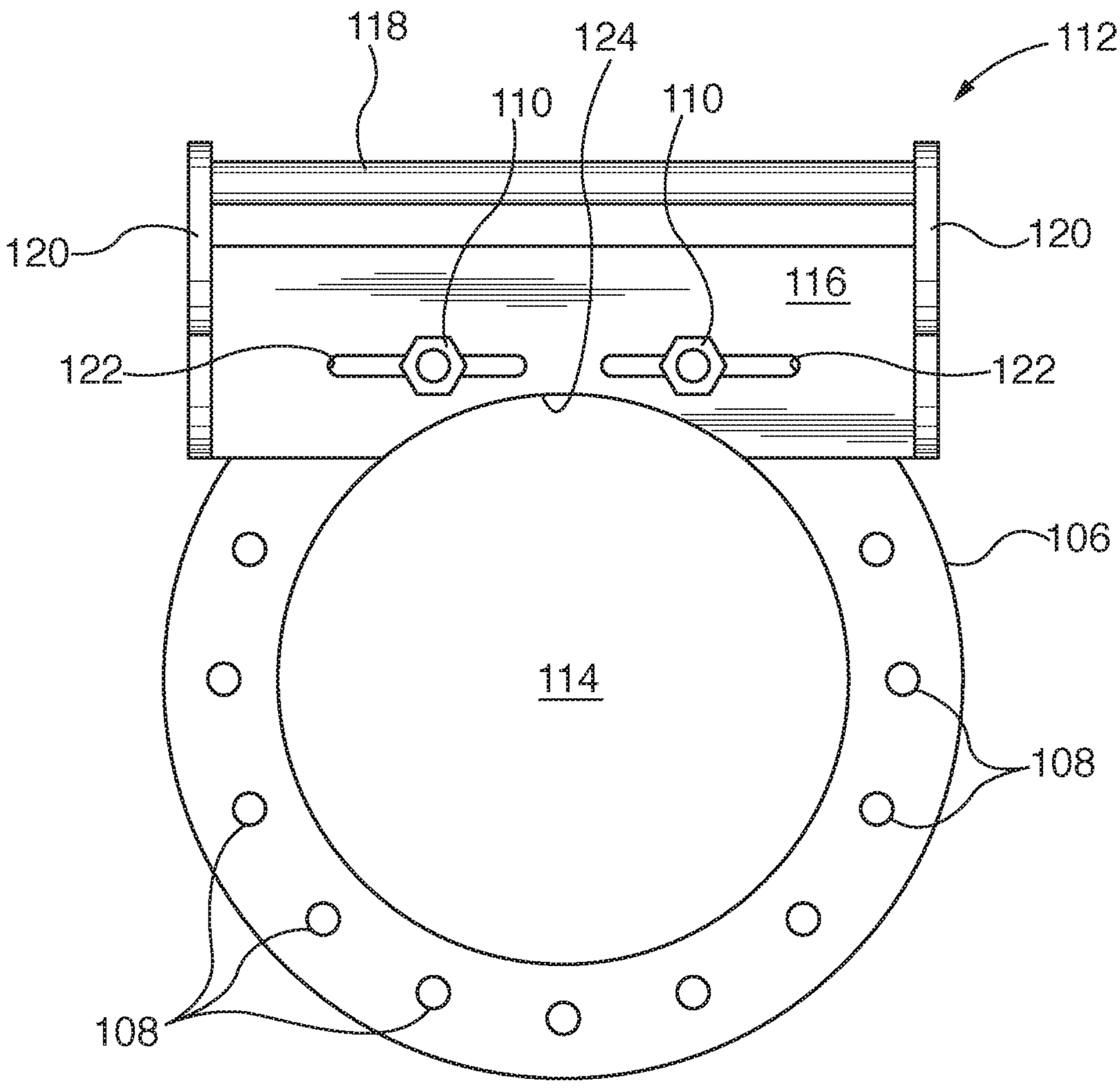
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FIG. 3

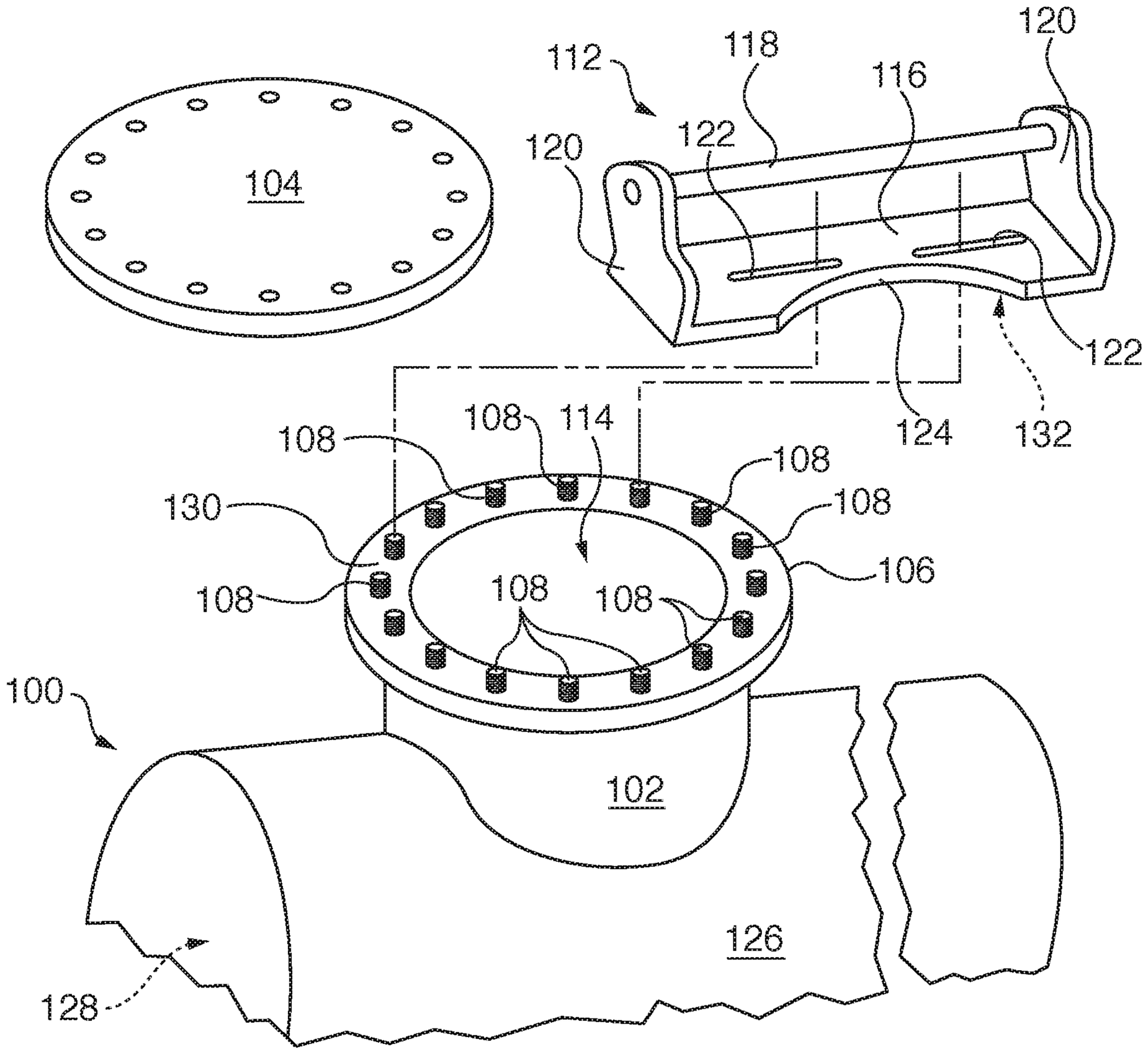
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FIG. 2

PORTABLE MANWAY SECURING APPARATUS

REFERENCE TO RELATED APPLICATION

This application claims priority of U.S. Provisional Patent Application Ser. No. 62/310,850, filed Mar. 21, 2016, which is incorporated by reference in its entirety.

FIELD OF THE DISCLOSURE

The present disclosure relates to securing apparatus, and more particularly to mountable securing devices for vessels.

BACKGROUND

Tanks, reaction chambers, large pipes, and other vessels may have manways to enable service personnel to enter the vessel. Typically, a manway comprises a short stubpipe projecting perpendicularly from a wall of the vessel, having a radiating flange. The flange contains studs or bolt holes for accommodating fasteners enabling secure mounting of a closure over the manway. In ordinary operation, the closure is securely bolted to the flange to contain pressure and contents of the vessel.

From time to time, service personnel must enter the vessel when the latter is empty. This may be done for example, for inspections, repairs, cleaning, unclogging, installation of instrumentation, and for other purposes. It is often difficult for service personnel to enter a manway. For example, the nature of the chemicals used in the manway may make surfaces of the manway slippery, or otherwise hazardous to contact by hand, such as due to potential toxicity of residues of the substances contained in the vessel.

There exists a need to facilitate entry of service personnel into vessels through manways.

SUMMARY

The disclosed concepts address the above stated situation by providing in exemplary embodiments a portable securing apparatus, such as a handhold, which is readily secured to a manway having a portal intended to enable entry of service personnel into a vessel. The securing apparatus may afford an improved grip to assist service personnel and any others to enter the vessel. The securing apparatus may be mounted on a temporary basis to the manway. The securing apparatus may include a mounting plate mountable to a flange customarily provided as part of the manway, and a handle for accommodating manual grasp of the securing apparatus.

These general concepts and additional inventive concepts are implemented via a plurality of exemplary embodiments. In certain embodiments, a securing apparatus for temporary mounting to a flange of a manway includes a portal enabling entry therein by service personnel into a vessel. The securing apparatus may include a mounting plate temporarily mountable to the flange of the manway, and a handle for accommodating manual grasp of the securing apparatus by the service personnel. The flange of the manway may be secured to a closure over the manway by one or more fasteners, and the mounting plate of the securing apparatus may include a mounting structure cooperating with the fasteners. The fasteners may define threaded shafts thereon, and the mounting structure may define at least one orifice dimensioned and configured to pass the threaded shafts therethrough. The orifices may include at least one elongated hole.

The mounting plate may further define a recess projecting therein, the recess being dimensioned and configured to prevent the mounting plate from obstructing the portal when the securing apparatus is installed on to the manway. A cross-section of the portal can be circular in shape, and the recess may be arcuate in shape and reflect a configuration of the portal of the manway. The handle maybe offset from the recess such that the handle avoids obstructing the portal when the securing apparatus is installed on the manway. The handle may include a grab bar respectively coupled to and spaced apart from the mounting plate. Also, two stanchions for supporting the grab bar may be provided, the grab bar being positioned between the two stanchions. Furthermore, the grab bar can be circular in cross-section thereof and the positioning thereof may be affixed along a longitudinal axis between the two stanchions.

In certain embodiments, a vessel is provided, which includes a manway for enabling entry therein, and the vessel includes: an outer wall defining a chamber for enclosing contents of the vessel; the manway may define a portal to the chamber, the portal penetrating the outer wall; the manway may include a closure and one or more elongated fasteners operable to secure the closure over the portal. A removable securing apparatus may be provided, including a mounting structure cooperating with the fasteners, the removable securing apparatus being operable for installation thereof on the manway where the closure is disengaged from the manway, and the securing apparatus may further include a handle affixed to the mounting structure. The fasteners may include a shaft portion, and the removable securing apparatus can define at least one orifice dimensioned and configured for passage through it of the shaft portion. Additionally, the manway may include a flange portion encircling the portal and presenting a flat face facing away from the chamber; the fasteners may be operable to engage the flange when serving to secure the closure over the portal; and the mounting structure may include a mounting plate, a surface of it operable to seat flush against the flat face of the flange when the mounting plate is engaged with the manway. The fasteners may be operable to be reassembled to the flange to mount the mounting plate to the manway when the closure has been disengaged from the manway. The portal can be circular in cross-section, and the mounting plate can define a recess portion projecting into the mounting plate defined by the outer edge of the portal, whereby the portal of the manway remains unobstructed by the mounting plate when the securing apparatus is in a state of engagement on the manway.

In additional embodiments, a method of facilitating entry of service personnel into a vessel through a manway of the vessel is provided, the method including: removing a closure from the manway by removing one or more fasteners coupling the closure to the manway; installing a securing apparatus in place of the closure, where the securing apparatus includes a mounting structure cooperating with the fasteners of the closure; and fastening the securing apparatus to the manway in place of the closure, using the fasteners coupling the closure to the manway. The method may further include stabilizing the securing apparatus on the manway by seating a surface of a mounting plate of the securing apparatus flush against a flange of the manway when the fasteners secure the mounting plate of the securing apparatus to the flange of the manway.

The nature of the disclosed concepts will become readily apparent upon further review of the following specification and drawings.

BRIEF DESCRIPTION OF THE DRAWINGS

Various objects, features, and attendant advantages of the disclosed concepts will become more fully appreciated as the same becomes better understood when considered in conjunction with the accompanying drawings, in which like reference characters designate the same or similar parts throughout the several views, and wherein:

FIG. **1** is a perspective view of the inventive vessel in its ordinary condition, with a manway sealed by a closure in accordance with certain embodiments;

FIG. **2** is an exploded perspective view of the inventive vessel of FIG. **1**, also showing an inventive securing apparatus for temporary mounting to the vessel, according to certain embodiments;

FIG. **3** is a top plan view of the vessel of FIG. **1** with the inventive securing apparatus shown in FIG. **2** installed thereon, according to certain embodiments.

DETAILED DESCRIPTION

Referring first to FIG. **1**, a vessel **100** having a manway **102** to enable entry of service personnel is shown in an exemplary ordinary service condition, with manway **102** sealed by a closure **104**. Vessel **100** may contain substances such as, for example, crude petroleum, partially refined petroleum products, fully refined petroleum products, and diverse fluid chemical products. Vessel **100** may also be a pressure vessel intended to contain the substances at pressures elevated from atmospheric pressure, may accommodate chemical reactions, or otherwise support processes using any types of substances.

In certain embodiments, such as in an ordinary service condition, closure **104** is fastened to a flange **106** of manway **102**. A gasket (not shown) can also be used to effect leak-tight connection of closure **104** to flange **106**. Fasteners, such as threaded fasteners **108**, secure closure **104** tightly to flange **106**. Fasteners **108** may be threaded bolts **108** or alternatively may include threaded studs (not shown) permanently fixed to flange **106**. Either bolts **108** or studs receive nuts **110**.

FIG. **2** shows closure **104** removed from vessel **100**, as would occur, for example, for service operations conducted inside vessel **100**. In certain embodiments, a securing device such as securing apparatus **112** is provided for mounting to flange **106** of manway **102** having a portal **114** enables entry of service personnel (not shown) into vessel **100**. Securing apparatus **112** provides for temporary or permanent mounting; in the present exemplary embodiment, it provides temporary mounting. In exemplary embodiments, securing apparatus may be held onto in any capacity, by for example, held by an individual's hands or other limbs, secured to the individual with the individual's clothing, or secured by additional apparatus. Securing apparatus **112** in this exemplary embodiment includes a mounting plate **116**, mountable for example to flange **106** of manway **102**, and a handle for accommodating manual grasp of securing apparatus **112**.

In the illustrated exemplary embodiment, securing apparatus **112** includes a grab bar **118** coupled to and spaced apart from mounting plate **116**. Grab bar **118** is thereby operable to be readily grasped by service personnel entering vessel **100**. Securing apparatus **112** further includes two stanchions **120** for supporting grab bar **118**, wherein grab bar **118** is straight between the two stanchions **120**. A straight grab bar **118** can be intuitively located for grasping by service personnel who may be visually distracted from concentrating on grab bar **118**. In the exemplary embodiment, grab bar **118** is circular in a cross section and passes through a longitudinal axis parallel to the longitudinal axis of securing apparatus **112**. In an exemplary embodiment, the circular cross section avoids rough projections and edges to prevent the hands of the service personnel from rotating about grab bar **118**, as the service personnel might find convenient when lowering his or her body into vessel **100**.

Flange **106** of manway **102** include fastening apparatus, e.g., bolts **108**, for securing closure **104** over manway **102**. Mounting plate **116** of securing apparatus **112** includes a mounting structure cooperating with the fasteners of flange **106**. In an exemplary embodiment, the mounting structure engages the fasteners of flange **106**, thereby avoiding requiring additional fasteners or mounting apparatus. More particularly, the fasteners may include threaded shafts (e.g., the shafts of threaded bolts **108**), and the mounting structure of mounting plate **116** of securing apparatus **112** includes at least one orifice **122** (FIG. **2**) dimensioned and configured to pass the threaded shafts of the fasteners therethrough. Providing orifices **122** enables the fasteners including nuts **110** (FIG. **3**) being used to secure closure **104** in place, thereby avoiding the requirement for additional hardware or apparatus in this exemplary embodiment. In the exemplary embodiment, the at least one orifice **122** includes at least one elongated-shaped hole **122** as shown. This embodiment accommodates minor misalignments which may occur when positioning securing apparatus **112** relative to flange **106**.

In the illustrated exemplary embodiment, mounting plate **116** includes a recess **124** projecting in a concave fashion into mounting plate **116**. Here, recess **124** is dimensioned and configured to avoid causing mounting plate **116** to obstruct portal **114** when securing apparatus **112** is installed onto manway **102**. The features of this embodiment are also illustrated in FIG. **3** (described below).

In certain vessels **100** which are temporarily modified in accordance with the embodiments to accommodate mounting of securing apparatus **112**, portal **114** is of a circular shape. Here, recess **124** is arcuate and reflects the configuration of portal **114** of manway **102**. In additional embodiments, however, where portal **114** is of another shape (e.g., rectangular), recess **124** is fashioned to snugly fit with respect to such other shapes.

Referring particularly to FIG. **3**, in securing apparatus **112**, the handle (e.g., grab bar **118**) is offset from recess **124** so that the handle avoids obstructing portal **114** when securing apparatus **112** is installed on manway **102**. In the exemplary embodiments of FIGS. **2** and **3**, the handle is located away from portal **114** relative to mounting plate **116** to provide ergonomic accommodation of an arm of the service personnel entering vessel **100**.

With continued reference to FIGS. **1-3**, and in accordance with certain exemplary embodiments, vessel **100** includes one or more manways **102** of one or more shapes, for enabling entry by service personnel. Vessel **100** includes associated securing apparatus **112** enabling entry of service personnel into vessel **100**. Vessel **100** includes an outer wall **126** defining a chamber **128** for enclosing contents of vessel **100**. Manway **102** penetrates outer wall **126** and enables entry of a person into chamber **128**. Manway **102** includes portal **114** to chamber **128**, closure **104**, and elongated fasteners (e.g., bolts **108**) for securing closure **104** over portal **114**. Removable securing apparatus **112** includes mounting structure (e.g., mounting plate **116** and holes **122**) cooperating with the fasteners, whereby removable securing apparatus **112** may be installed on manway **102** after closure **104** has been removed from manway **102**.

In vessel **100**, the fasteners each include a shaft, and removable securing apparatus **112** includes holes **122** dimensioned and configured to pass the shafts of the fasteners therethrough. Manway **102** includes flange **106** encircling portal **114** and presenting a flat face **130** facing away from chamber **128**. The fasteners engage flange **106** when securing closure **104** over portal **114**. Securing apparatus **112** includes mounting plate **116** including a surface **132** (FIG. **2**) seating flush against flat face **130** of flange **106** when mounting plate **116** is installed on manway **102**. The fasteners are reassembled to flange **106** to mount mounting plate **116** to manway **102** when closure **104** has been removed to enable entry of service personnel into vessel **100**. In an exemplary embodiment, a soft material (e.g., rubber) is placed between surface **132** and flat face **130** to prevent damage to the gasket sealing surface of the flange **106**.

In vessel **100**, portal **114** is circular, and mounting plate **116** includes recess **124** projecting into mounting plate **116**, whereby portal **114** of manway **102** remains unobstructed by mounting plate **116** when securing apparatus **112** is installed on manway **102**.

Using the apparatus described herein, a method of facilitating entry of service personnel into vessel **100** through manway **102** of vessel **100** includes removing a closure **104** from manway **102** by removing fasteners coupling closure **104** to manway **102**; installing securing apparatus **112** in place of closure **104**, where securing apparatus **112** has a mounting structure cooperating with the fasteners of closure **104**; and fastening the securing apparatus **112** to manway **102** in place of closure **104**, using the fasteners coupling closure **104** to manway **102**. The method of facilitating entry may further include stabilizing securing apparatus **112** on manway **102** by seating a surface (e.g., surface **132**) of mounting plate **116** of securing apparatus **112** flush against flange **106** of manway **102** when the fasteners secure mounting plate **116** of securing apparatus **112** to flange **106** of manway **102**.

In various embodiments, differing materials (e.g., wood and/or steel) are used to manufacture securing apparatus **112**. In an exemplary such steel embodiment, securing apparatus **112** is cut out of ⅜ inch thick carbon steel plate; the frame is bent with a hydraulic bender on both ends to create the stanchions **120**; a 1 inch round bar made of carbon steel is inserted through the round holes in the frame of the stanchions; the bar is welded, on the inside and/or outside at both ends to the stanchions. In the various embodiments, the size of securing apparatus **112** depends on the size of the manway **102**. For example, in an exemplary embodiment wherein flange **106** is 18 inches, a completed securing apparatus **112** of dimensions 24 inches width, 9 inches height, 6 inches depth can be used.

It will be appreciated that although manway **102** has been depicted herein as opening vertically, above vessel **100**, other orientations of manway **102** are possible. For example, manway **102** may open vertically downwardly, horizontally at a side of vessel **100**, or alternatively, at any angle to a vertical direction.

In the preceding description, numerous specific details are set forth in order to provide an understanding of the present invention. It will be apparent, however, to one skilled in the art that the present invention may be practiced without these specific details. The specific details may be varied from and still be contemplated to be within the spirit and scope of the present disclosure. Many modifications of examples set forth herein will come to mind to one skilled in the art to which the present disclosure pertains having the benefit of the teachings presented in the foregoing descriptions and the associated drawings.

This written description uses examples of the subject matter disclosed to enable any person skilled in the art to practice the same, including making and using any devices or systems and performing any incorporated methods. The patentable scope of the subject matter is defined by the claims, and can include other examples that occur to those skilled in the art. Such other examples are intended to be within the scope of the claims.

The above-described embodiments are intended to be illustrative in all respects, rather than restrictive, of the embodiments. Thus, the embodiments are capable of many variations in detailed implementation that can be derived from the description contained herein by a person skilled in the art. No element, act, or instruction used in the description of the present application should be construed as critical or essential to the embodiments unless explicitly described as such. Also, as used herein, the article "a" is intended to include one or more items. Therefore, it is to be understood that the present disclosure is not to be limited to the specific examples presented and that modifications and other examples are intended to be included within the scope of the appended claims. Moreover, although the foregoing description and the associated drawings describe examples of the present disclosure in the context of certain illustrative combinations of elements and/or functions, it should be appreciated that different combinations of elements and/or functions may be provided by alternative implementations without departing from the scope of the appended claims.

I claim:

1. A securing apparatus for temporary mounting to a flange of a manway comprising a portal and facilitating entry therein by service personnel into a vessel and wherein said portal defines a tubular path perpendicular to said portal, the securing apparatus comprising a mounting plate, said plate comprising a planar shape and having a lower surface adapted for temporarily mounting to a top surface of said flange and adjacent to said manway in a fixed position, said plate further comprising a lateral side having an arcuate shaped recess portion, and a handle for accommodating manual grasp of the securing apparatus by said service personnel, wherein said handle is attached to said mounting plate with a pair of stanchions that extend perpendicular from said plate and support and are attached to opposite sides of said handle above said plate and said handle further comprises a linear rod section, said rod section is vertically displaced from said mounting plate, whereby the portal of the manway remains unobstructed by said handle when the securing apparatus is in a state of engagement on the manway and wherein said linear rod section of said handle has a length of approximately 24 inches.

2. The securing apparatus of claim **1**, wherein the flange of the manway is secured to a closure over the manway by one or more fasteners, and the mounting plate of the securing apparatus comprises a mounting structure cooperating with the fasteners.

3. The securing apparatus of claim **2**, wherein the fasteners define threaded shafts thereon, and the mounting structure defines at least one orifice dimensioned and configured to pass said threaded shafts therethrough.

4. The securing apparatus of claim **3**, wherein the at least one orifice comprises at least one elongated hole, and said elongated hole comprises a slot.

5. The securing apparatus of claim **1**, wherein the mounting plate defines a recess projecting therein, the recess being

dimensioned and configured to prevent the mounting plate from obstructing said portal when the securing apparatus is installed on to the manway.

6. The securing apparatus of claim **5**, wherein a cross-section of the portal is circular in shape, and the recess is arcuate in shape and said conforms to a configuration of the portal of the manway.

7. The securing apparatus of claim **5**, wherein the handle is offset from the center of said plate wherein when installed on a manway the handle avoids obstructing the portal when the securing apparatus is installed on the manway.

8. The securing apparatus of claim **1**, wherein the handle comprises a grab bar respectively coupled to and spaced apart from the mounting plate, and said bar is parallel to a tangent to circle defined by said portal.

9. The securing apparatus of claim **8**, further comprising two stanchions for supporting the grab bar, the grab bar being positioned between the two stanchions.

10. The securing apparatus of claim **9**, wherein the grab bar is circular in cross-section thereof and the positioning thereof comprises being affixed along a longitudinal axis between the two stanchions.

11. A vessel comprising a manway for enabling entry therein, the vessel comprising:

an outer wall defining a chamber for enclosing contents of the vessel;

the manway defining a circular portal to the chamber, the portal penetrating said outer wall and further comprising an flange portion, said portal oriented so that the opening is in a horizontal plane, the manway comprising a closure and one or more elongated fasteners operable to secure the closure over the portal; and

a removable securing apparatus including a flat mounting plate cooperating with said fasteners, the removable securing apparatus being operable for installation thereof on the manway wherein the closure is disengaged from the manway, and the securing apparatus further comprising a handle affixed to said flat mounting plate wherein said handle is attached to opposite stanchions that extend from a top surface of said flat mounting plate and comprises a linear rod section, said rod section is elevated and offset from the center of said flat mounting plate and said flat mounting plate having an arcuate lateral side form a recess.

12. The vessel of claim **11**, wherein at least one said fastener comprises a shaft portion, and the removable securing apparatus defines at least one orifice being dimensioned and configured for passage therethrough of said shaft portion.

13. The vessel of claim **11**, wherein:

said flange portion further comprises an annular ring encircling the portal and presenting a flat top front face facing away from the chamber;

the fasteners being operable to engage the flange portion when serving to secure the closure over the portal; and

said mounting plate comprising a surface thereof operable to seat flush against the flat top front face of said flange when the mounting plate is engaged with the manway, and the fasteners are operable to be reassembled to the flange to mount the mounting plate to the manway when the closure has been disengaged from the manway.

14. The vessel of claim **13**, wherein the portal is circular in cross-section, and said mounting plate defines a recess portion thereof projecting into the mounting plate and said recess portion has a profile that is the same as the outer edge of the portal, whereby the portal of the manway remains unobstructed by the mounting plate when the securing apparatus is in a state of engagement on the manway.

15. The device as recited in claim **1** wherein said rod section comprises a straight section that extends a distance of approximately 24 inches.

16. The device as recited in claim **11** wherein said rod section comprises a straight section that extends a distance of approximately 24 inches.

* * * * *